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On the Future of Applied Smoking Research: Is It Up in Smoke?

This issue of the *American Journal of Public Health* appropriately focuses on smoking, the major preventable determinant of disease and death in the United States.¹ Reducing tobacco use is a priority for national health objectives,² and passive smoking is recognized as a health threat.^{3,4}

Although smoking has consistently and substantially declined in the United States during the past 30 years,¹ the problem is far from solved. One in six deaths each year (about 434 000) is attributed to smoking.⁵ Nearly one third of all adults in the United States still smoke and 22%, or 40 million, are expected to be smokers in the year 2000.⁶ The economically disadvantaged are more likely to smoke than those more advantaged, and in recent years smoking has declined less among women than among men.¹ More than 3000 new smokers are recruited each day, and since 1980 the smoking prevalence among young people has remained about the same.¹

Applied research on smoking is essential for developing effective smoking-reduction programs and policies and to evaluate their effects. Is the necessary applied research being conducted? I am concerned that there is no national program of applied smoking research to address the broad array of research questions that must be answered to meet the national obligation to reduce smoking. Before elaborating on this problem and before offering suggestions for its solution, I define the types of research I have in mind.

The purpose of applied public health research is to inform programs and policies ("interventions"). The two types of applied research considered here are etiological studies and evaluations. Etiological studies provide the information necessary to make inferences about causality.

What causes people to smoke, or why, are fundamental questions of etiological research. Knowledge of assumed causes informs interventions. The second type, evaluation research, addresses whether and why interventions have the intended effects. Is smoking reduced by the intervention and, if so, why and under what conditions? Both etiological and evaluation studies use quantitative research methods, range from small to large, and vary by how much is known about the problem being addressed.

Fortunately, we know quite a bit about the etiology of smoking and have identified some interventions that work. For example, we know that adults with less education are much more likely to smoke than those with more education.¹ The most consistent and powerful predictor of whether adolescents smoke is whether their friends smoke.⁷ School-based curricula can delay the onset of smoking and physicians can reduce smoking by their patients.^{8,9} More generalizations could be added to these.

However, more applied studies are needed. Etiological studies leave much of the variance in smoking unexplained, even when all the variables we consider relevant are included and when both biochemical and self-report measures of smoking are used. The reasons for the link between educational background and smoking among adults have not been empirically established; knowing them could provide important clues on how to most effectively reduce smoking. The finding that adolescents are more likely to smoke if their friends smoke has been used to justify smoking prevention programs that emphasize peer pressure resistance; however, if the propensity for friends to smoke is explained by friend selection rather than

by friend influence, as has been suggested,¹⁰ then the rationale for the peer pressure resistance component weakens.

Seventy-five percent of school dropouts smoke,¹¹ and we do not know what to do about it. We know little about how smoking norms emerge during preadolescence and how families and institutional policies influence smoking. The social and psychological determinants of exposure to environmental tobacco smoke have received little study. The list of needed research could go on, but the point would remain: many more questions need to be addressed by etiological research if interventions are to be adequately informed.

Have all the needed evaluation studies been conducted? We do not know the components of school-based programs that influence adolescent smoking or whether combinations of components can produce relatively large effects. Such knowledge could yield more cost-effective interventions. The effects of school programs decay before the students graduate.^{12,13} Indeed, no intervention that delays smoking onset past adolescence has been identified. Perhaps more durable effects require other types of interventions, such as programs delivered to families or policies that regulate smoking. But relatively few of these new approaches have been studied. And there have been few evaluations of interventions implemented to reduce exposure to environmental tobacco smoke. Little research has been conducted on how to disseminate and institutionalize programs known to work. Most existing interventions, and the innovative ones of the future, remain to be assessed by evaluation research.

Applied smoking research is in progress. The easiest to identify is the Community Intervention Trial for Smoking Cessation (COMMIT)¹⁴ funded by the National Cancer Institute (NCI). It involves 11 pairs of treatment and control sites throughout the United States and Canada. COMMIT should answer important questions, but it does not represent a broad program of applied smoking research; it evaluates one mode of intervention, prevention of smoking onset is of minor interest, and etiological research is not emphasized. Similarly, other current activities that involve smoking do not completely satisfy the need. Three large-scale evaluations of community programs funded by the National Heart, Lung and Blood Institute (NHLBI) include smoking as one of multiple risk factors;¹⁵⁻¹⁷ the studies evaluate only one approach to intervention, etiology is not emphasized,

and the focus on multiple risk factors may dilute attention to smoking. NHLBI also funds (a) the Child and Adolescent Trial for Cardiovascular Health (CATCH), which investigates the influence of a school-based program on eating habits, physical activity, and smoking¹⁸ and (b) the Lung Health Study, which evaluates the effect of a smoking cessation program on smoking and respiratory disease.¹⁹ The National Institute on Drug Abuse funds etiological and evaluation studies of drug use, but investigators are expected to include other drugs when studying smoking. Such inclusions are inappropriate for some important research questions and can reduce attention to smoking behavior. These and other federal agencies as well as private organizations fund programs and individual studies with smoking as a primary or secondary interest, but not as part of a larger program of applied smoking research.

To be sure, we will learn a great deal from studies in progress, but they neither individually nor collectively address the broad array of applied research questions that require attention. A federal organization with a primary focus on research, such as the National Institutes of Health, with close and continued involvement of persons outside the federal government, needs to be designated to take the leadership role in organizing and implementing a continuing program of applied smoking research.²⁰ Only the federal government has the resources to address this national public health problem. A wide range of research questions should be addressed. The program should feature genuinely collaborative relationships among organizations, researchers, and practitioners. To accomplish this, mechanisms for frequent interaction within and among groups of researchers and practitioners are essential. Procedures for peer review of research proposals, with study sections consisting of persons doing applied research who have expertise in smoking, need to be established. Funding levels should be congruent with the magnitude of the problem. The application of research findings, with adequate time and resources for appropriate translation of research findings into interventions, should be given special attention.

Some features of the former Smoking, Tobacco, and Cancer Program (STCP) of NCI, the largest organized effort on applied smoking research to date, should be considered for this program.²¹ The STCP involved experts from throughout the United States in the identification

of priority areas for a grants program to fund rigorous evaluation studies that could be broadly disseminated if found to be effective. Large-scale evaluation studies survived careful peer review. The research informed COMMIT, and their main findings are now being reported.

A key ingredient of the STCP was the close collaboration between researchers from different research projects, the granting agencies, and practitioners responsible for policy formulation and program implementation. Grantees were expected to attend at least two workshops organized by NCI each year. The workshops, which often included practitioners and consultants, were small to facilitate close and continuing collaborative relationships. NCI was well informed about the studies as they progressed, as was necessary to optimize their contribution to COMMIT and other programs. The collaborative environment fostered accomplishments that otherwise would not have occurred. For example, issues of major journals were devoted to detailed descriptions of the interventions being evaluated,²² the first meaningful comparison of adolescent smokeless tobacco use in populations throughout the United States was made,²³ consensus reports on key ingredients for interventions were published,^{24,25} and intervention guidelines were developed.²⁶⁻²⁸ These products contrast sharply with those from the more isolated model that characterizes most research.

A national program also should consider features of the exemplary University of California Tobacco-Related Disease Research Program. With annual revenues of \$30 million from cigarette taxes constitutionally earmarked for research, the program funds a broad array of studies on tobacco in California.²⁹ Funded studies survive rigorous peer review by experts who conduct applied smoking research. Researchers and practitioners advise the program.

Many procedures and topics will require open and frank discussion for a successful national program. The topics to be discussed include the following: (1) identification of the appropriate federal agency to coordinate the program; (2) mechanisms to assure close collaboration of researchers across institutions, between researchers and practitioners, and with the federal sponsor; (3) the relative emphasis of etiological and evaluation research; (4) the distribution of resources across studies of smoking cessation and onset prevention; (5) individual versus collective determination of study areas to be empha-

sized;³⁰ (6) the mix of single-problem studies conducted by multiple groups of researchers with studies conducted by individual researchers across a broader array of research questions; (7) preferred types of funding mechanisms, such as grants, collaborative agreements, or contracts; (8) the need to have grants reviewed by study sections composed of persons involved in applied research; (9) criteria to determine when research findings are ready for application;³¹ (10) ways to translate research findings into interventions and the roles of researcher and practitioner in this process; (11) criteria for determining when areas have received sufficient research attention; and (12) procedures to assess the progress of the research program. The agenda would be full and the discussion lively.

It is time to match the national commitment to smoking reduction with a national commitment to a broad program of applied smoking research. □

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